Remarks

Applicant respectfully requests reconsideration. Claims 1-3, 5-12 and 15-32 were pending for examination. Applicant has amended claim 1. Claims 16-24 have been cancelled without prejudice. No new matter has been added.

Rejections Under 35 U.S.C. § 103

1. The Examiner maintained the rejection of claims 1-3, 6-12 and 15-32 under 35 U.S.C. § 103(a) as unpatentable over the Daw et al. reference or the France et al reference in view of the Mayes et al. patent (US 6,150,459) and the McAuslan publication (WO 87/05038). Applicant respectfully requests reconsideration of the rejection.

The present invention provides a therapeutic vehicle which includes at least one keratinocyte which can detach from a surface of the vehicle upon contact with a wound bed to promote re-epithelialisation and wound healing.

An important feature of a therapeutic vehicle of the present application, if it is to be used to promote re-epithelialisation and wound healing, is the detachment of the cells comprised within the therapeutic vehicle and subsequent re-location of the cells into the wound. Without the initial cell detachment from the surface, re-epithelialisation cannot occur. As taught at page 8, lines 18-23 of the specification, keratinocyte cultures on plasma polymer surfaces having high acid functionality detach from the surface and transfer to a wound bed model.

There is no teaching or suggestion in the combination of cited prior art references of all of the elements of the claimed invention, and in particular that the surfaces produced could be used to promote re-epithelialisation and wound healing by facilitating the detachment of keratinocytes from said culture surface and transfer to an acute or chronic cutaneous wound, upon contact with a wound bed of said wound.

France et al. discloses results of experimental work carried out to determine optimum conditions for cell attachment to a plasma co-polymer of acrylic acid and octa-1,7-diene. France et al. show that the optimum conditions for cell attachment to the plasma co-polymer is the provision of an acid functionality of around 2.3 %. There is no discussion or suggestion in France et al. that under certain conditions cells may detach as well as attach to a surface.

France et al. relates to the problem of determining how to achieve cell attachment to a surface. France et al. teach that for cell attachment, a surface should have an acid functionality of around 2.3 %. There is no disclosure in France et al. that teaches that for keratinocyte detachment from a surface upon contact with a wound bed a high acid functionality should be used.

Thus, France et al. does not teach that at least one keratinocyte is capable of detachment from a culture surface and transfer to an acute or chronic cutaneous wound upon contact with a wound bed, as is claimed.

Daw et al. describes osteoblast attachment to self assembled monolayers using, for example, acid terminated SAMs and also acid terminated PCP. Daw et al. states that "maximum cellular attachment" occurs to surfaces containing 3% carboxylic acid. (see, e.g., page 1724, left column, fifth full paragraph). Daw et al. does not relate to the culture of keratinocytes.

The surface disclosed in Daw et al. comprises osteoblast-like cells which could not be used to promote re-epithelialisation and wound healing by facilitating the detachment of keratinocytes from said culture surface and transfer to an acute or chronic cutaneous wound, upon contact with a wound bed of said wound.

Thus, Daw et al. also does not teach that at least one keratinocyte is capable of detachment from a culture surface and transfer to an acute or chronic cutaneous wound upon contact with a wound bed, as is claimed.

Mayers et al. relates to the surface modification of biomedical devices to give controlled cell responses. Mayers et al. at col. 16, lines 12-15 teaches that cell-regulating microporous biodegradable membranes useful as temporary barrier devices in wound healing applications can be prepared by casting a solution of a comb polymer, a second polymer and a mutual solvent into an aqueous-based coagulation bath. The comb polymer elicits controlled cellular response.

The combination of Mayers et al. with either France et al. or Daw et al. does not disclose a therapeutic vehicle comprising a cell culture surface obtainable by plasma polymerization and containing a carboxylic acid functionality of at least 5%, to which at least one keratinocyte is attached, characterized in that said at least one keratinocyte is capable of detachment from said culture surface and transfer to an acute or chronic cutaneous wound, upon contact with a wound bed. Thus Mayers et al. does not provide the elements of the claimed invention missing from the Daw et al. or France et al. references.

Moreover, both France et al. and Daw et al. relate to the coating of a surface with a plasma polymer. There would be no motivation for the person of ordinary skill in the art to apply a plasma polymer to the surface of the cell-regulating microporous biodegradable membranes useful as temporary barrier devices in wound healing of Mayers et al. as the polymer content of the membrane of Mayers et al. is already modified to provide a controlled cell response.

McAuslan et al. relates to an implant comprising a hydrogel, the surface of which is chemically modified so as to stimulate the attachment and growth of endothelial cells. The implants of McAuslan et al. are for internal implantation into a subject. As stated at page 1, lines 6-10 of McAuslan et al., the blood vessels and internal organs are lined with a thin layer of endothelial cells. The rapid development of a lining of endothelial cells is important in attaining a non-thrombogenic vascular graft.

The combination of McAuslan et al. with either France et al. or Daw et al. does not disclose a therapeutic vehicle comprising a cell culture surface obtainable by plasma polymerization and containing a carboxylic acid functionality of at least 5%, to which at least

one keratinocyte is attached, characterized in that said at least one keratinocyte is capable of detachment from said culture surface and transfer to an acute or chronic cutaneous wound, upon contact with a wound bed. Thus McAuslan et al. does not provide the elements of the claimed invention missing from the Daw et al., France et al. or Mayers et al. references.

Moreover, there would be no motivation for the person of ordinary skill in the art to apply a plasma polymer surface as taught by France et al. or Daw et al. to an implant of McAuslan et al. There would be no motivation for a skilled person to provide a surface which supports the growth of keratinocytes or osteoblasts on an implant, where it is desirable to stimulate the attachment and growth of a distinct cell type, namely endothelial cells, as taught by McAuslan et al.

Thus in summary, there is no teaching in the combination of the cited art that indicates that cells can attach, grow and proliferate in an undifferentiated state on a plasma polymer surface and also detach from that surface in certain conditions. Specifically, there is no teaching that keratinocytes are capable of detachment from a plasma polymerized culture surface containing a carboxylic acid functionality of at least 5% upon contact with a wound bed.

In view of the comments above, it is submitted that the combination of France et al. or Daw et al. with McAuslan et al. or Mayers et al., does not indicate that keratinocytes are capable of detachment from a plasma polymerized culture surface containing a carboxylic acid functionality of at least 5% upon contact with a wound bed, and therefore does not provide all of the elements of the claimed invention.

Moreover, the skilled person would not find a reason or motivation to combine the references in the manner done by the Examiner, as discussed above, in particular given the different purposes and teachings of the references in the combination.

Accordingly, the claimed invention is not obvious in view of the teaching of the prior art, and Applicant respectfully requests that the rejection of claims 1-3, 6-12 and 15-32 under 35 U.S.C. § 103(a) be withdrawn.

2. The Examiner also rejected claim 5 as unpatentable over Daw et al. or France et al. in combination with the Mayes et al and McAuslan references, in view of Yanagihara et al (US patent 4,693,799). Applicant respectfully traverses the rejection.

Yanagihara et al. relates to a process for the production of a plasma polymerized film. Yanagihara et al. does not provide the elements missing from the other references of the combination, and thus the entire combination of Daw et al. or France et al. in combination with Mayes et al and McAuslan et al., in view of Yanagihara et al., does not teach or suggest all of the elements of the claimed invention.

Accordingly, Applicant respectfully requests that the rejection of claim 5 under 35 U.S.C. 103(a) be withdrawn.

CONCLUSION

In view of the foregoing remarks, this application should now be in condition for allowance. A notice to this effect is respectfully requested. If the Examiner believes, after this amendment, that the application is not in condition for allowance, the Examiner is requested to call the Applicant's attorney at the telephone number listed below.

If this response is not considered timely filed and if a request for an extension of time is otherwise absent, Applicant hereby requests any necessary extension of time. If there is a fee occasioned by this response, including an extension fee, that is not covered by an enclosed check, please charge any deficiency to Deposit Account No. 23/2825.

Respectfully submitted,
Short, et al., Applicant

By: _____

John R. Van Amsterdam
Reg. No. 40,212
Wolf, Greenfield & Sacks, P.C.
600 Atlantic Avenue
Boston, Massachusetts 02210
Telephone: (617) 646-8000

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